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Firm Size, M&A Announcement Returns and the Financial Crisis

Evidence from the U.S.

Abstract

Prior academic literature has found evidence that there is a significant difference in the announcement returns between small and large acquirers. I examine a sample of 24,870 U.S.-based acquisitions between 1980 and 2017. The sample consists of transactions where a public company acquires the entire share capital of a private or public U.S. company. The equally-weighted abnormal announcement return for acquiring companies is 1.5%. The announcement return for the shareholders of large acquirers is almost three percentage points lower than the return for small acquirers. These results support the previous findings obtained by Moeller, Schlingemann, and Stulz (2004) and are robust to deal and firm characteristics. Small acquirers exceed the performance of large acquirers over the sample period; however, large acquirers seem to perform relatively better during the financial crisis.

Keywords: Acquisitions, Size effect, Financial crisis

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1. Introduction

In this paper, I examine the returns to shareholders of large and small companies when an acquisition of another firm is announced. Mergers and acquisitions should have a positive effect on the wealth of the shareholders of both the target and the acquirer (see Harford, Humphery-Jenner, and Powell, 2012). However, prior academic research has found out that various deal and company-specific characteristics affect the success of a merger, consequently driving the stock market reaction after a deal announcement is made. One characteristic, that has been subject for numerous studies, is the size of the acquiring firm. Prior research has provided evidence that there has been historically a statistically significant difference in the stock market returns for large and small acquirers after an acquisition is announced (Moeller *et al*., 2004). Despite the results obtained in previous studies, the evidence of the effects of the acquirer size is not completely consistent. Thus, as suggested by Yaghoubi *et al*. (2016), further research is required to better understand the *size effect*.

In addition to the research on the effects of firm size on acquisition performance, academics have been particularly interested in the effects of financial crises and economic shocks. The financial crisis of 2008 had a significant impact on the global economy, affecting external financing and acquisition activity (e.g. Campello *et al.*, 2010; Beltratti and Paladino, 2013). Acquisitions are usually large investments, and often financed partially by debt. Lacking access to external financing may reduce the investment opportunities of smaller firms, hence affecting their acquisition performance negatively. Prior research has suggested, on the other hand, that the largest companies may benefit from such an event, as their internal assets provide shelter from economic jolts (Wan and Yiu, 2009). However, a comprehensive study in the U.S. merger market examining the size effect during different periods and financial distress is yet to be made.

My sample consists of U.S.-based acquisitions of over $1 million by public companies from 1980 to 2017, comprising a total of 24,870 acquisitions, a more comprehensive sample than in any previous acquisition study. The transactions are obtained from Securities Data Corporation (SDC). The equally-weighted average abnormal announcement return for acquiring companies between 1980 and 2017 is 1.5%, which implicitly indicates, that on average, acquisitions create value for the shareholders of acquiring companies. However, as found out in previous studies, the equally-weighted average returns for large companies and small companies are different. In my sample, the gains to shareholders of large and small firms are -0.4% and 2.5%, respectively. This announcement effect on large companies may indicate that on average, large companies destroy shareholder value

when making acquisitions, consistent with previous findings of abnormal announcement returns (Moeller et al., 2004; Masulis, Wang, and Xie, 2007; Humphery-Jenner, and Powell, 2014). However, the magnitude of the negative announcement returns for large companies decreases in the period after the beginning of the financial crisis, implying that large companies may be able to improve their acquisition performance during financial distress and stringent credit supply. Small companies, on the other hand, perform relatively worse after the financial crisis. Further examinations provide evidence, although not completely robust, that the size of a firm may enable better acquisitions during financial distress.

Building upon previous research, this study investigates the size effect with an extensive set of U.S. acquisition data, in an effort to provide further evidence of the size effect itself as well as to measure the effect during the latest financial crisis. My study contributes to the existing acquisition literature by focusing on the following areas of research. First, in order to extract the impact of the firm size on cumulative announcement abnormal returns, a broad set of deal and firm characteristics is examined. I provide new evidence of the size effect in the U.S. M&A market and the characteristics behind the differences in announcement returns. Previous studies have provided mixed results of the size effect, which is one of the reasons why a comprehensive study of a long period is needed in this area of research.

Second, I measure the size effect during different periods, providing evidence of the differences in announcement returns during the sample period. Prior studies have provided different results of the magnitude and the direction of the stock market reactions during announcements on different sample periods, which is why three periods, characterized by different economic conditions, are examined.

Lastly, I focus on the effects of the financial crisis on overall announcement returns and find indications of the *reversed size effect* during periods of financial distress. The access to external financing during recessions has been studied before (see Campello *et al*., 2010), but evidence of the impacts of financial constraint on acquisition performance is more or less lacking. This study extends the knowledge of the indirect effects of the financial crisis, thus contributing to the knowledge of the overall effects of a shock in the global economy.

2. Literature Review and Hypotheses

2.1 Size Effect

The study by Moeller *et al*. (2004) examined transactions in U.S. between 1980 and 2001. It was one of the first to identify *the negative size effect* in acquisition announcement returns. Moeller *et al*. (2004) categorized acquirers based on their size, comparing their market capitalizations to the percentiles of all NYSE firms. They defined small (large) companies as firms that have a market capitalization below (above) the 25th percentile of NYSE firms. The equally-weighted announcement abnormal return in their sample is 1.1%. However, the acquiring-firm shareholders lose $25 million per transaction on average. Moeller *et al*. (2004) argue that the different sign of equally-weighted and value-weighted abnormal returns results from a disparity in returns for small and large acquirers, referring to a negative correlation between firm size and acquisition gains. Their results are not reversed over time and are robust to different definitions of firm size and abnormal returns.

Moeller *et al*. (2004) measure acquisition performance with cumulative abnormal returns over a three-day event window around the announcement of the acquisition. Cumulative abnormal returns are calculated by subtracting the expected market return for the acquirer from the realized stock return. Although the size effect is significant between the largest and smallest acquirers, the effect is also robust, when size is measured as the book value of assets and market capitalization. Also, Humphery-Jenner and Powell (2014) provide evidence of the negative size effect, suggesting that is a global phenomenon. Furthermore, Alexandridis *et al*. (2011) study the impacts of deal size and acquisition premium paid by the acquirers and find a robust negative relationship between the size of the target and the premium paid. As large companies tend to make smaller acquisitions compared to their size, the performance of large acquirers is lower than that of small firms. However, also mixed results of acquisition performance and the size effect have been found (see e.g. Tuch and O'Sullivan, 2007; Barkema and Schijven, 2008).

Several hypotheses have been proposed to explain the negative size effect on abnormal announcement returns. Prior academic research has discussed the importance of managerial incentives on firm acquisition performance. Jensen (1986) argues that empire-building managers might prefer acquisitions over distributing cash to shareholders. Loderer and Martin (1997) provide evidence that the cumulative abnormal returns increase as the managers' stockholding in the firm increases. Larger firm size may widen the gap between the management and the shareholders, thus leading to a decline

in the effectiveness of the mechanisms used to control and supervise the management. Poor acquisition performance might result from *managerial hubris*; managers are overconfident acquiring firms, which may lead to overpaying for acquisitions (Roll, 1986). Thus, firm size might not be the reason for poor acquisition performance itself, but rather a cause for agency problems and other issues leading to a decline in acquisition returns.

Alexandridis *et al*. (2011) note that on top of the high acquisition premia, large companies seem to fail to deliver the desired synergies, consequently leading to value destruction. An acquisition may also be a signal to markets that the firm is overvalued (when equity is used) or that its internal growth opportunities are exhausting (Travlos, 1987; Jovanovic and Braguinsky, 2002), which might cause a negative stock market reaction when an acquisition is announced. Furthermore, Humphery-Jenner and Powell (2014) argue that the negative size effect exists internationally but is smaller in countries of weak governance.

Moeller *et al*. (2004) argue that the negative acquisition announcement returns of large firms are primarily caused by the premiums paid by large acquirers, consistent with the *managerial hubris* hypothesis. Overpayment by a large firm might be more likely to occur because of the excess resources and the lack of managerial incentives. However, it might also be the extensive resources that become an advantage during economic downturns, as external funding may be limited or even unavailable. Hence, especially the financial crisis from 2008 onwards, becomes an interesting period in terms of acquisition performance by small and large firms. There are academic studies about economic crisis periods that have found a positive size effect during economic recessions. Wan and Yiu (2009) provide evidence, that during the Asian Economic Crisis in the late 1990s, *organizational slack* improved acquisition performance. They argue that firms with excess resources can complete activities that bear considerable risk, such as acquisitions, and thus perform relatively better than their financially restricted competitors.

2.2 The Financial Crisis

The financial crisis of 2008 was a global economic shock, which derived from the sub-prime crisis in the U.S housing markets and impacted the entire global economy during 2007-2009. The market capitalizations may decrease sharply during stock market crashes, leaving the valuations far from the pre-crash levels. The 2008 stock market crash destroyed 55% of the market value of U.S. stocks between October 2007 and March 2009. Therefore, many companies that lost a substantial amount

of their market values became attractive acquisition targets to buyers (Uygur *et al*., 2014). The financial crisis also affected the availability of external financing. Credit supply was reduced drastically; in the middle of the crisis in 2008, new loans to large companies decreased by 47% (Ivashina and Scharfstein, 2010). Smaller companies faced problems too, as the biggest U.S. banks reduced their lending to small companies significantly (Chen, Hanson, and Stein, 2017).

The financial crisis put a lot of pressure on small companies that struggled with internal financing to sell some of their assets (Campello, *et al.,* 2010). This might have enabled larger firms with steadier financing to benefit from the problems of the small companies, by acquiring their assets or even acquiring entire enterprises, with a cost below their intrinsic value. Lacking access to external funding also reduces investment opportunities, simultaneously decreasing the financial performance of companies (Campello *et al*., 2010). As reported by Duchin *et al*. (2010), the investments made by U.S. companies declined 6.4% relative to the average long-term level during the financial crisis.

Although the definition of the financial crisis has been subject to a lot of observation, the exact start and end-point of the crisis are almost impossible to unanimously define, since the difference between normal and non-normal crisis levels are hard to identify (Babecký *et al*., 2014). However, prior literature suggests that the main phases of the financial crisis took place between August 2007 and March 2009 (Moberg, 2019).

2.3 Hypotheses

Previous academic literature has provided evidence of the negative correlation between acquirer size and acquisition announcement returns. Furthermore, studies focusing on financially distressed periods have suggested that the size effect may be reversed between small and large acquirers, as the access to external financing decreases.

H1: Acquiring firm size has a negative relation to announcement abnormal returns, and small acquirers outperform large acquirers in acquisition gains (*Size Effect*)

H2: The size effect is reversed during the financial crisis; larger firm size correlates with higher announcement returns (*Reversed Size Effect*)

Prior research also suggests a decrease in investments during periods of financial distress. The financial crisis affected the entire global economy, increasing overall investor uncertainty. As large financial decisions, mergers and acquisitions are valued carefully by the investors during periods of financial distress.

H3: The announcement returns are negatively affected by the financial crisis (*Crisis Effect*)

3. Data and Methods

3.1 The Sample

My sample consists of successful acquisitions completed in U.S between 1980 and 2017. Acquisition data is gathered from SDC's U.S Mergers and Acquisitions Database. Only acquisitions of over $1 million are considered in my sample. Also, if the transaction value is less than 1% of the book value of the total assets of the acquirer, the transaction is excluded from the sample. Transaction value is reported by SDC. I further require that (1) the acquirer owns less than 50% of target's shares before the transaction, (2) the acquirer ends up with 100% of target's shares after the transaction is completed, (3) the acquirer is a public company listed in NYSE, NASDAQ or AMEX and (4) the target is a public or a private U.S company. After collecting the transaction data from SDC, I gather financial information of the acquirers and targets from Thomson Reuters Datastream. Since the market capitalizations of the acquirers are of significant importance in my empirical study, I eliminate the transactions where the market capitalization for the announcement date is not found.

These requirements yield a sample of 24,870 transactions. I divide the transactions into two main categories: transactions made by large and small acquirers. The sizes of the acquirers are defined by comparing their market capitalizations to the size percentiles of NYSE in a given year. Large acquirers are above the 75^{th} percentile of all listed companies in NYSE in a given year. On the other hand, small companies have a market capitalization below the 25^{th} percentile in NYSE. The transactions are listed in Table 1 by year and size of the acquirer.

Table 1
Sample distribution by announcement year
The sample consists of 24,870 acquisitions by U.S. publicly listed companies between 1980 and 2017 listed by SDC. The deal value is at least $1 million and 1% of the acquirer's market value. Large (small) companies have a market capitalization equal to or over (below) the top (bottom) 25^{th} percentile of all listed firms in NYSE in the same year. Means and medians are calculated of all acquiring firms in the same year and reported in 2017 US dollars.

Announcement year	Number of acquirers			Acquirer size (2017 US$ millions)	
	All	Large	Small	Mean size	Median size
1980	24	11	6	7 878.8	871.3
1981	153	45	33	3 152.7	658.4
1982	161	27	58	943.4	311.8
1983	218	31	106	1 189.1	324.8
1984	265	35	117	1 985.1	351.2
1985	141	40	29	3 191.1	943.2
1986	242	52	74	2 384.0	717.3
1987	217	45	64	3 172.6	728.6
1988	239	46	98	2 502.2	456.7
1989	306	34	139	1 571.9	332.2
1990	272	27	122	1 699.9	265.4
1991	287	23	138	1 254.5	279.0
1992	436	33	243	1 223.6	234.6
1993	605	41	345	1 039.8	254.3
1994	842	61	502	1 352.6	203.5
1995	892	80	476	1 718.9	314.7
1996	1 185	135	576	2 056.1	421.4
1997	1 651	149	861	2 506.0	440.8
1998	1 724	210	890	3 757.3	443.6
1999	1 440	262	629	9 796.8	568.3
2000	1 406	312	544	11 853.3	788.8
2001	813	107	419	5 303.4	418.2
2002	705	80	387	3 380.4	427.2
2003	680	71	379	3 737.4	456.4
2004	853	74	523	2 948.2	498.0
2005	945	108	582	5 218.3	520.4
2006	996	99	620	4 678.5	541.4
2007	1 002	108	605	5 786.0	589.3
2008	678	50	411	3 152.5	388.0
2009	415	65	223	6 363.4	398.1
2010	599	99	293	6 607.3	720.7
2011	576	72	298	4 250.4	688.4
2012	618	92	316	5 159.3	712.1
2013	592	51	314	3 896.5	807.5
2014	794	92	451	6 849.6	712.1
2015	716	97	365	6 246.4	856.0
2016	554	73	257	8 955.7	1 031.8
2017	628	73	312	6 197.6	964.8
All	24 870	3 110	12 805		

About half of all transactions between 1980 and 2017 are made by small firms while big firms account for about 13% of all transactions. Table 1 demonstrates, how the number of acquisitions seems to be related to the overall economic situation; the peak in acquisitions is before the Internet bubble in 1998 (1,724 acquisitions) and M&A activity again increases from 2003 until the financial crisis in 2008. The average market capitalization of all acquirers between 1980 and 2017 is $4,643 million (in 2017 dollars). Average market capitalization is $194 million for small and $31,309 million for large acquirers.

3.2 Methodology

After gathering and cleaning the acquisition data and other required data to conduct the empirical study, I divide the acquirers to size groups based on their market capitalization as defined in section 3.1. As my study focuses on the announcement returns to acquirers, a three-day event-window is used to calculate the cumulative abnormal returns around the date of the announcement. A three-day event-window is perhaps the most used way to evaluate bidder returns in event studies, as noted by Brown and Warner (1985), cited in Moeller et al. (2004). Daily stock return is calculated from daily closing prices reported by Datastream. Similar to the study by Moeller et al. (2004), the cumulative abnormal returns (CAR) are estimated using the CRSP equally-weighted index returns as the benchmark for market returns, by subtracting the market return from stock return over the three-day event window. Again, to ensure the estimated returns are robust, I also use the value-weighted CRSP market index and industry index to estimate the market returns.

To examine, whether the size effect has changed during the sample period, I divide the sample in three sub-periods: 1980-2000, 2001-2007 (Pre-crisis) and 2008-2017 (Post-crisis). In section 5, I conduct regressions to control the size effect for firm and deal characteristics and to study the size effect during the financial crisis. Control variables in regressions are determined based on their effects on announcement returns in prior research, as discussed in section 2.1. Acquirer size, the key variable in regression analyses, is measured both by absolute and continuous measurers. The book value of assets and market capitalization are used as continuous size measures. The book value of assets is recorded at the end of the fiscal year prior to the announcement. Market capitalization used in regressions is calculated 30 days before the announcement to make the variable robust to leaked information around the announcement date. Both size measures are also transformed to natural logarithms to reduce the influence of possible outliers. Also relative size is used in regressions to control for the *relative size effect* (see Moeller *et al.*, 2004).

4. Acquirer Size and Abnormal Returns

4.1 Announcement Effect between 1980 and 2017

Moeller *et* al. examine the performance of acquiring-firms by calculating the cumulative abnormal return over a three-day event window, benchmarking the stock return to the return of the CRSP equally-weighted index. The same approach is used in my study. The equally-weighted cumulative abnormal returns for all acquisitions between 1980 and 2017 are 1.46% (median 0.35%) and the value-weighted abnormal returns are -0.45%. When the sample is further divided into small and large companies, I find that the equally-weighted and value-weighted abnormal returns are 2.55% and 1.20% for small companies, respectively, and -0.41% and -0.65% for large companies. The difference between the returns for both groups is statistically significant at 1% level. The results are robust to using the value-weighted CRSP market index and industry index as market models when calculating the cumulative abnormal returns.

Referring to the equally-weighted abnormal returns over the event window, it seems that acquisitions are profitable for acquirers on average. However, the value-weighted return for all firms is negative, suggesting a disparity in returns between small and large acquirers. The economic significance of large market capitalization acquirers is more important than that of small ones and this should be taken into consideration when abnormal returns are discussed (Moeller *et al*., 2004). The dollar abnormal return measures the average dollar profit or loss to shareholders when an acquisition is announced. The average dollar abnormal gain for all acquisitions is -$23.6 million (adjusted to 2017 US$). Large acquirers lose $223.1 million on average, while small firms make small profits. Overall, during the sample period, shareholders lose over $587 billion in acquisition announcements.

As presented in Table 2, small firms tend to perform better compared to large acquirers, consistent with Moeller *et al*. (2004). Humphery-Jenner and Powell (2011, 2014) also report positive abnormal returns both in Australia and globally. On the other hand, previous research has found insignificant negative returns for the acquirers of public companies (Andrade *et al*., 2001). Furthermore, small acquirers are more likely to acquire private companies due to their excess returns compared to public targets (Chang, 1998).

Table 2

Cumulative announcement abnormal returns to acquiring firms: entire sample

The sample consists of 24,870 acquisitions by U.S. publicly listed companies between 1980 and 2017 listed by SDC. The deal value is at least $1 million and 1% of the acquirer's market value. Large (small) companies have a market capitalization equal to or over (below) the top (bottom) 25th percentile of all listed firms in NYSE in the same year. $CAR_{(-1.+1)}$ denotes the three-day cumulative abnormal return (in percent) to the acquiring firm measured using the market model (CRSP equally-weighted). $ANPV_{(\$2017)}$ denotes the inflation-adjusted (base-year: 2017) abnormal dollar returns in millions, defined as the change in the acquirers market capitalization minus the predicted change from the market model. $VWCAR_{(-1,+1)}$, is the value-weighted cumulative abnormal return, calculated as the sum of the dollar abnormal returns across acquirers divided by the aggregate market capitalization of acquirers. ANPV/TV is the abnormal dollar return divided by the total transaction value. The final row of the table lists the number of observations in each group. Statistical significance levels are based on the following difference tests on equality in distributions: t-test for means and a Wilcoxon-test for medians. Median values are in parentheses. The sum of abnormal returns in each group is presented in italics. Return definitions are based on *Moeller et al*. (2004).

	All	Large	Small	Difference
	(1)	(2)	(3)	(2)-(3)
$CAR_{(-1.+1)}$	1.461[a]	-0.414[a]	2.546[a]	-2.960[a]
	(0.351)[a]	(-0.210)[a]	(0.690)[a]	(-0.900)[a]
$ANPV_{(\$2017)}$	-23.6[a]	-223.1[a]	2.4[a]	-225.5[a]
	(0.5)[a]	(-27.3)[a]	(0.4)[a]	(-27.7)[a]
	-587 232.7	*-487 417.1*	*23 531.8*	
$VWCAR_{(-1.+1)}$	-0.451	-0.647	1.203	-1.850
ANPV/TV	0.186[a]	-0.015	0.168[a]	-0.183[b]
	(0.015)[a]	(-0.028)	(0.019)[a]	(-0.048)[a]
n	24 870	3 110	12 805	

[a]Statistical significance at 1%
[b]Statistical significance at 5%
[c]Statistical significance at 10%

4.2 Abnormal Returns and Deal Characteristics

Table 3 provides the main characteristics of both deals and acquirers of the sample, sorted to large and small acquirers. On top of CARs, also deal and firm characteristics differ between small and large acquiring firms. Small companies make on average bigger acquisitions relative to their size and it also takes less time for small companies to complete their transactions, which can probably be explained by the regulation larger firms are exposed to. Large firms, on the other hand, are more likely to complete hostile takeovers and tender offers. Moreover, the transactions carried out by large acquirers are more often competed, which might partially explain the return disparity between the

size groups (Bradley *et al*., 1988). As suggested by Chang (1998), the probability of acquiring a private target among small acquirers is high compared to large acquirers; almost 86% of acquisition targets by small firms are private. This may be one important factor when examining the size effect, as existing literature has noticed higher abnormal returns for firms acquiring private targets with equity (Chang, 1998; Fuller *et al.*, 2002). In contrast, Travlos (1987) suggests that equity offers for public targets have led to lower returns. However, large companies seem to pay for the acquisitions with cash more often than small companies, which has generally led to higher returns compared to other payment methods (Fuller *et al*., 2002). Also, as concluded by Morck *et al.* (1990), the acquisitions of public firms have lower returns, when the acquisition is diversifying (Conglomerate in Table 3).

Table 3

Summary statistics: sorted by acquirer size

The sample consists of 24,870 acquisitions by U.S. publicly listed companies between 1980 and 2017 listed by SDC. The deal value is at least $1 million and 1% of the acquirer's market value. Large (small) companies have a market capitalization equal to or over (below) the top (bottom) 25th percentile of all listed firms in NYSE in the same year. The transaction value (reported by SDC) is the purchase price paid by the acquirer (excluding fees and other expenses). Relative size is the transaction value divided by the market capitalization of the acquirer at the end of the previous fiscal year prior to the announcement. Days to completion is the time between the announcement date and the completion date of the acquisition. Liquidity index is (as in Moeller *et al.*, 2004) the value of all corporate control transactions for each year and two-digit SIC code divided by the book value of total assets of all firms in the same two-digit SIC code and year (provided by Compustat). Competed deals have at least one other bidder for the same target. Hostile and tender offers represent the percentage of deals that are reported as such by SDC. Conglomerate deals involve transactions, where the acquirer and the target have a different two-digit SIC code. All cash and all stock include transactions where the payment consists purely of cash or stock, respectively. In Panel B, Assets is the book value of total assets at the end of the fiscal year prior to the announcement. Cash includes cash and marketable securities, and debt is defined as the book value of assets minus the book value of equity. The market value of the acquirer is the book value of total assets minus the book value of equity plus market capitalization. Tobin's q is calculated as market value divided by the book value of total assets. Median values are in parentheses.

	Large	Small	All
Panel A: Deal characteristics			
Transaction value (TV)	2 530.15	40.41[a]	426.07
TV / Assets	0.16	0.27[a]	0.23
	(0.06)	(0.11)[a]	(0.09)
Relative size	0.16	0.49[a]	0.29
	(0.04)	(0.17)[a]	(0.11)
Days to completion	106.02	99.16[a]	71.27
	(81)	(76)[a]	(37)
Liquidity index for target	0.16	0.15[c]	0.16
	(0.06)	(0.05)[a]	(0.06)
Hostile (%)	1.22	0.16[a]	0.37
Tender offer (%)	15.49	1.61[a]	4.80
Competed (%)	2.15	0.29[a]	0.07
Conglomerate (%)	44.77	45.60[a]	44.57
Target (%)			
Public	56.22	14.10[a]	23.70
Private	43.78	85.90[a]	76.30
Payment (%)			
All cash	47.41	32.74[a]	39.38
All stock	30.95	27.92[a]	28.06

	Large	Small	All
Panel B: Acquirer characteristics			
Assets (book)	25 261.67	384.16[a]	4 400.93
	(7 975.19)	(132.37)[a]	(487.38)
Cash / Assets (book)	0.16	0.17[a]	0.17
	(0.10)	(0.09)[a]	(0.09)
Debt/ Assets (book)	0.54	0.57[a]	0.54
	(0.55)	(0.54)	(0.54)
Market capitalization	24 218.24	152.51[a]	3 595.03
	(9 243.18)	(86.95)[a]	(343.72)
Market value	43 265.58	449.05[a]	7 167.50
	(16 241.96)	(208.84)[a]	(811.09)
Tobin's q	2.88	1.96[b]	2.13
	(1.94)	(1.31)[a]	(1.50)

[a]Statistical significance between large and small at 1%
[b]Statistical significance between large and small at 5%
[c]Statistical significance between large and small at 10%

In table 4, the equally-weighted abnormal returns are sorted by acquirer size, form of payment and target public status. There is a significant difference between the announcement returns for acquisitions of private targets and public targets. Acquisition, in which the target is a public company,

returns are negative for mixed and equity payments, and generally lower than in acquisitions of private companies, consistent with previous findings of acquisition announcement returns (Moeller *et al*., 2004; Humphery-Jenner and Powell, 2011). Moreover, equity payments yield higher returns when the target is private for both large and small acquirers. This finding is partly in line with Moeller *et al*. (2004), who suggest that equity payments are more profitable for small firms acquiring private targets, but cash payments are related to higher returns for large acquirers. Regardless of the target public status and payment method, small acquirers outperform large firms across all combinations.

Table 4

Cumulative announcement abnormal returns by firm size, form of payment and target status

The sample consists of 24,870 acquisitions by U.S. publicly listed companies between 1980 and 2017 listed by SDC. The deal value is at least $1 million and 1% of the acquirer's market value. Large (small) companies have a market capitalization equal to or over (below) the top (bottom) 25th percentile of all listed firms in NYSE in the same year. $CAR_{(-1,+1)}$ denotes the three-day cumulative abnormal return (in percent) to the acquiring firm measured using the market model. Mixed means that acquisition is paid with cash, equity, and other considerations, Equity (Cash) is an all equity (cash) payment. The significance level of difference is based on t-tests for mean values.

$CAR_{(-1,+1)}$	Mixed	Equity	Cash	All	Difference		
	(1)	(2)	(3)	(4)	(1)-(2)	(2)-(3)	(1)-(3)
Panel A - Full sample							
All	1.354[a]	1.791[a]	1.099[a]	1.461[a]	-0.437[c]	0.692[a]	0.255
Large	-1.325[a]	-0.822[a]	0.020	-0.414[a]	-0.503	-0.841[a]	-1.344[a]
Small	2.301[a]	3.787[a]	1.686[a]	2.546[a]	-1.486[a]	2.101[a]	0.615[b]
Difference	-3.625[a]	-4.609[a]	-1.666[a]	-2.960[a]			
Panel B - Private targets							
All	2.178[a]	3.939[a]	1.166[a]	2.113[a]	-1.761[a]	2.773[a]	1.012[a]
Large	0.577	1.443	0.211[a]	0.550[a]	-0.866	1.232[b]	0.367
Small	2.558[a]	5.600[a]	1.582[a]	2.922[a]	-3.042[a]	4.018[a]	0.976[a]
Difference	-1.981[a]	-4.157[a]	-1.372[a]	-2.372[a]			
Panel C - Public targets							
All	-1.532[a]	-1.921[a]	0.722[a]	-0.638[a]	0.389	-2.643[a]	-2.255[a]
Large	-2.134[a]	-2.325[a]	-0.063	-1.165[a]	0.191	-2.262[a]	-2.071[a]
Small	-0.248	-1.068[a]	2.156[a]	0.256	0.821	-3.225[a]	-2.404[a]
Difference	-1.887[a]	-1.257[a]	-2.220[a]	-1.421[a]			

[a]Statistical significance at 1%
[b]Statistical significance at 5%
[c]Statistical significance at 10%

4.3 Announcement Effect during Different Periods

My study examines, whether the size effect has changed over time. To conduct such a study, I first divide my sample to three different periods: (1) 1980-1999, (2) 2000-2007, and (3) 2008-2017. I calculate the CARs to all sample firms and large and small acquirers as in the previous section (section 3.1) for the three periods. These three periods have all different characteristics and events which may have impacted both acquisition activity and returns. The first period (1980-1999) was very active in terms of acquisitions made; during the peak year of 1998, 1,724 firms were acquired. After the aftermath of the dot-com bubble, the period from 2000 to 2007 was a period of relatively fast economic expansion in U.S. This all came to a sudden end in 2008, when the U.S. subprime crisis led to a global financial crisis, reducing the credit supply to companies and freezing economic growth. In the *reversed size effect hypothesis* (*H2*), I expect the performance of large firms to be better relative to small firms during (and after) the financial crisis. Larger acquirers should be able to make better acquisitions following their extensive assets and access to external financing, something that the small firms have struggled with during recessions (Cowling *et* al., 2012; Chen *et al*., 2017).

Table 5 provides the CARs for all three periods. Acquiring-firm shareholders have gained positive announcement abnormal returns during every period. The gains to shareholders are the largest between 2000 and 2007, when the CAR for all firms is 1.70%. However, during the same period, the dollar abnormal returns are -$52.4 per acquisition; large acquirers' shareholders lose $424.9 on average after announcing an acquisition. The equally-weighted abnormal returns for large companies between 2008 and 2017 are 0.10%, significantly above the pre-crisis period. Small firms earn returns of 2.44%, less than they earned pre-crisis (2000-2007). Although different time periods are usually not directly comparable because of the unique characteristics of the periods, this comparison suggests that the magnitude of the size effect may change during different economic periods (see *crisis effect hypothesis, H3*).

Table 5

Cumulative announcement abnormal returns to acquiring firms: period comparison

The sample consists of 24,870 acquisitions by U.S. publicly listed companies between 1980 and 2017 listed by SDC. The deal value is at least $1 million and 1% of the acquirer's market value. Large (small) companies have a market capitalization equal to or over (below) the top (bottom) 25th percentile of all listed firms in NYSE in the same year. The three sections in Table 4 represent the following periods: 1980-1999, 2000-2007, and 2008-2017. The deal value is at least $1 million and 1% of the acquirer's market value. Large (small) companies have a market capitalization equal to or over (below) the top (bottom) 25th percentile of all listed firms in NYSE in the same year. $CAR_{(-1,+1)}$ denotes the three-day cumulative abnormal return (in percent) to the acquiring firm measured using the market model (CRSP equally-weighted). $ANPV_{(\$2017)}$ denotes the inflation adjusted (base-year: 2017) abnormal dollar returns in millions, defined as the change in the acquirers market capitalization minus the predicted change from the market model. $VWCAR_{(-1,+1)}$, is the value-weighted cumulative abnormal return, calculated as the sum of the dollar abnormal returns across acquirers divided by the aggregate market capitalization of acquirers. ANPV/TV is the abnormal dollar return divided by the total transaction value. The final row of the table lists the number of observations in each group. Statistical significance levels are based on the following difference tests on equality in distributions: t-test for means and a Wilcoxon-test for medians. Median values are in parentheses. Return definitions are based on *Moeller et al*. (2004).

	1980-1999			2000-2007			2008-2017		
	All	Large	Small	All	Large	Small	All	Large	Small
$CAR_{(-1,+1)}$	1.277[a]	-0.535[a]	2.273[a]	1.703[a]	-0.649[a]	2.996[a]	1.508[a]	0.099	2.444[a]
	(0.289)[a]	(-0.452)[a]	(0.784)[a]	(0.402)[a]	(-0.366)[a]	(0.672)[a]	(0.395)[a]	(0.027)	(0.690)[a]
$ANPV_{(\$2017)}$	-15.9[b]	-160.8[a]	2.4[a]	-52.4[a]	-424.9[a]	2.3[a]	-3.3	-82.9	2.6[a]
	(0.4)[a]	(-34.0)[a]	(0.5)[a]	(0.4)[a]	(-44.6)[a]	(0.4)[a]	(0.6)[a]	(4.2)	(0.4)[a]
$VWCAR_{(-1,+1)}$	-0.485	-0.727	1.692	-0.833	-1.020	1.035	-0.049	-0.205	1.050
ANPV/TV	0.256[a]	0.084	0.171[a]	0.133[b]	-0.228	0.198[a]	0.120[a]	0.073	0.124[a]
	(0.012)[a]	(-0.043)[b]	(0.024)[a]	(0.015)[a]	(-0.037)[a]	(0.017)[a]	(0.019)[a]	(0.006)	(0.016)[a]
n	11 300	1 388	5 511	7 400	959	4 050	6 170	763	3 244

[a]Statistical significance at 1%
[b]Statistical significance at 5%
[c]Statistical significance at 10%

In spite of the positive equally-weighted announcement abnormal returns, after the year 2000, there are only five years during which the average dollar abnormal return is positive (2007, 2012, 2013, 2014, and 2017). The scale of the abnormal returns seems to be related to the size of the acquirer; small firms seem to perform better than large firms regardless of the period. The results indicate also, perhaps unsurprisingly, that large firms seem to perform relatively better during periods of limited credit supply, in line with Wan and Yiu (2009). My results of the size effect, although not fully comparable due to a different size definition, are consistent with the major announcement effect

studies conducted by Moeller et al. (2004) and Humphery-Jenner and Powell (2011). Both studies similarly find a negative correlation between acquirer size and announcement returns.

5. Regressions on Announcement Returns

5.1 Firm Size and Deal Control Variables

The results of announcement abnormal returns from sample period 1980-1999 are similar to the evidence provided by Moeller *et al*. (2004).[1] On the other hand, the two periods after the turn of the century, seem to have different announcement reactions compared to years between 1980 and 1999. Furthermore, the announcement reaction during the post-crisis era differs significantly from the pre-crisis period in terms of announcement abnormal returns, as illustrated in Table 5. Considering these, I focus on the sample period from 2000 to 2017. In table 6, the cumulative announcement abnormal returns are explained using four different size variables as well as several controlling variables, which have been considered to have impacted announcement returns in previous studies.[2] Also year dummies are included, to capture the influence of time-series trends.

The results provide evidence of the size effect, in line with Moeller *et al*. (2004), since the size variables are statistically significant at the 1% level in all four regressions and correlate negatively with CARs. The continuous size measures *ln*Assets and *ln*Equity are negative, and the size dummies Large and Small are negative and positive, respectively. As previously presented in Table 4, the announcement reaction is positively affected when the target is a private company. Moreover, tender offers have higher abnormal returns across all regressions. The returns are larger for deals that are fully paid by stock, consistent with Humphery-Jenner and Powell (2011) who similarly found higher abnormal returns for equity-financed deals. As for leverage, the amount of debt of the firm's total assets seems to be negatively correlated with announcement returns, consistent with the results obtained by Humphery-Jenner and Powell (2011).

Relative size is the transaction value divided by the market capitalization of the acquirer. Moeller *et al*. (2004) argue that the relative size of the acquisition is positively correlated with acquirer CARs,

[1] Moeller *et al*. (2004) studied acquisitions between 1980 and 2001. In order to check the robustness of my results, I also conducted regressions from the similar period. The magnitude of the size effect is the same as in Moeller *et al*. (2004).
[2] Prior acquisition studies have used different controlling variables to control for deal and company characteristics. For more details, see Moberg (2019).

meaning that all else equal, an increase in acquirer size leads to lower announcement returns. In their regression on CARs, the relative size variable has a significant coefficient of 0.0119. In my regressions, the coefficient for relative size is positive and statistically significant (5% level) for small and large acquirers, a further indication of the size effect. However, as argued by Moeller *et al.* (2004), the relative size effect should not be mixed with the size effect.

Table 6

Cross-sectional OLS regression on announcement abnormal returns (*Size effect*)

The sample consists of 13,570 acquisitions by U.S. publicly listed companies between 2000 and 2017 listed by SDC. The deal value is at least $1 million and 1% of the acquirer's market value. The dependent variable in each regression is the cumulative abnormal return to the acquiring firm over the three-day event window. Cumulative abnormal returns are measured using the market model (CRSP equally-weighted). Large (small) companies have a market capitalization equal to or over (below) the top (bottom) 25th percentile of all listed firms in NYSE in the same year. Variables *ln*Assets and *ln*Equity are natural logarithms of firm assets at the end of the previous fiscal year prior to the announcement and market capitalization 30 days prior to the acquisition, respectively. Hostile and tender offers represent the percentage of deals that are reported as such by SDC. Competed deals have at least one other bidder for the same target. Conglomerate deals involve transactions, where the acquirer and the target have a different two-digit SIC code. Liquidity index is (as in Moeller *et al.*, 2004) the value of all corporate control transactions for each year and two-digit SIC code divided by the book value of total assets of all firms in the same two-digit SIC code and year (provided by Compustat). Tobin's q is calculated as market value divided by the book value of total assets. Leverage is calculated as total debt divided by total assets. All cash and all stock include transactions where the payment consists purely of cash or stock, respectively. Relative size is the transaction value divided by the market capitalization of the acquirer at the end of the previous fiscal year prior to the announcement. P-values are reported in parentheses.

	Sample			
	(1)	(2)	(3)	(4)
Intercept	-0.0204[a]	-0.0253[a]	0.0880[a]	0.0375[a]
	(0.000)	(0.000)	(0.000)	(0.000)
Large	-0.0109[a]			
	(0.002)			
Small		0.0163[a]		
		(0.000)		
*ln*Assets			-0.0076[a]	
			(0.000)	
*ln*Equity				-0.0074[a]
				(0.000)
Private	0.0295[a]	0.0269[a]	0.0166[a]	0.0200[a]
	(0.000)	(0.000)	(0.000)	(0.000)
Hostile	-0.0073	-0.0088	-0.0016	-0.0044
	(0.849)	(0.819)	(0.966)	(0.907)
Tender	0.0137[b]	0.0133[b]	0.0127[b]	0.0152[b]
	(0.026)	(0.029)	(0.036)	(0.012)
Competed	0.0137	0.0144	0.0168	0.0163
	(0.267)	(0.243)	(0.168)	(0.181)
Conglomerate	0.0026	0.0023	0.0034	0.0014
	(0.239)	(0.295)	(0.127)	(0.519)
Liquidity index	0.0000	-0.0001	-0.0001	0.0000
	(0.800)	(0.725)	(0.661)	(0.877)
Tobin's q	0.0000	0.0000	0.0000	0.0000
	(0.611)	(0.650)	(0.457)	(0.550)
Leverage	-0.0003[a]	-0.0003[a]	-0.0005[a]	-0.0004[a]
	(0.000)	(0.000)	(0.000)	(0.000)
Cash	0.0000	0.0000	0.0000[a]	0.0000[a]
	(0.551)	(0.657)	(0.002)	(0.001)
Equity	0.0195[a]	0.0168[a]	0.0061[c]	0.0103[a]
	(0.000)	(0.000)	(0.085)	(0.003)
Relative size	0.0001[b]	0.0001[b]	0.0000	0.0000
	(0.030)	(0.045)	(0.188)	(0.762)
Year dummies	Yes	Yes	Yes	Yes
n	8 693	8 693	8 693	8 693
Adjusted R2	0.017	0.022	0.037	0.036

[a]Statistical significance at 1%
[b]Statistical significance at 5%
[c]Statistical significance at 10%

5.2 Firm Size, Deal Controls and the Financial Crisis

In order to study the size effect during the financial crisis, I include *Crisis* variable to the regression model. *Crisis* is a dummy variable, taking a value of one if the announcement takes place during the financial crisis (zero otherwise). The financial crisis is defined, as previous literature has identified, to take place between August 1st, 2008 and March 31st, 2009. Similar to Moberg (2019), I exclude the year 2000 from my regressions, because the announcement returns may be affected by the dot-com bubble that is not considered in more detail in my study.

The impact of the financial crisis on announcement abnormal returns is not unambiguous. The financial crisis has a negative influence on CARs when absolute size measures *ln*Assets and *ln*Equity are used. However, with size dummies, the effect of the financial crisis is not statistically significant. The dummy *Crisis* * *Firm size* measures the impact of the acquiring-firm size during the financial crisis. As expected in *reversed size hypothesis* (*H2*), the size has a positive correlation with CARs during the crisis, but the effect is only statistically significant at the 5% level when *ln*Equity is used as the measure of acquirer size. This indicates that the market capitalization overall, as a measure of size, correlates with higher CARs during announcements (during financial distress), but the effect is not constant among the smallest and largest size groups. Once more, the negative size effect remains consistent with previous findings.

Table 7

Cross-sectional OLS regression on announcement abnormal returns (*Financial crisis*)

The sample consists of acquisitions by U.S. publicly listed companies between 2001 and 2017 listed by SDC. The deal value is at least $1 million and 1% of the acquirer's market value. The dependent variable in each regression is the cumulative abnormal return to the acquiring firm over the three-day event window. Cumulative abnormal returns are measured using the market model (CRSP equally-weighted). Large (small) companies have a market capitalization equal to or over (below) the top (bottom) 25th percentile of all listed firms in NYSE in the same year. Variables *ln*Assets and *ln*Equity are natural logarithms of firm assets at the end of the previous fiscal year prior to the announcement and market capitalization 30 days prior to the acquisition, respectively. Control variables are defined as in Table 6. P-values are reported in parentheses.

	Sample			
	(1)	(2)	(3)	(4)
Intercept	-0.0126[a]	-0.0206[a]	0.0943[a]	0.0433[a]
	(0.000)	(0.000)	(0.000)	(0.000)
Crisis	-0.0057	0.0012	-0.0086[b]	-0.0314[a]
	(0.170)	(0.838)	(0.035)	(0.006)
Large	-0.0124[a]			
	(0.000)			
Small		0.0176[a]		
		(0.000)		
*ln*Assets			-0.0074[a]	
			(0.000)	
*ln*Equity				-0.0077[a]
				(0.000)
Crisis * Firm size	0.0103	-0.0117	0.0191	0.0040[b]
	(0.425)	(0.135)	(0.130)	(0.023)
Control variables	Yes	Yes	Yes	Yes
n	7 776	7 776	7 776	7 776
Adjusted R2	0.017	0.022	0.037	0.037

[a]Statistical significance at 1%
[b]Statistical significance at 5%
[c]Statistical significance at 10%

6. Discussion

6.1 The Size Effect between 1980 and 2017

Similar to previous research conducted by Moeller *et al*. (2004), I find a negative correlation between acquirer size and cumulative announcement abnormal returns. The results are robust to using different definitions of CARs and measures of size.[3] Implications of the size effect include, but are not limited to, the increased *managerial hubris* among large firms, suggesting that managers of large acquirers are more likely to overpay for acquisitions and make acquisitions with nonexistent synergy gains. Also as concluded in existing literature, small companies involve more often in acquisitions of private

[3] Cumulative abnormal returns are calculated using market models (similar to Moeller *et al*., 2004); benchmark indices include CRSP equally-weighted, CRSP value-weighted, and industry index.

firms, which have been subject to higher abnormal returns upon acquisition announcements. All-equity deals lead to higher abnormal returns when acquiring private targets, while deals paid by cash are more profitable for acquisitions of public targets. Although my study focuses on the smallest and largest acquirers, the size effect is present throughout the sample.

Longer sample period from 1980 to 2017 is studied at first, to ensure robustness with prior literature. Consistent with Moeller *et al*. (2004), small acquirers outperform large firms across the entire sample. However, I find evidence that the magnitude of the announcement abnormal returns for both large and small companies vary across different periods. In the subsamples of acquisitions completed during 1980-2017, there are significant differences in average returns after the financial crisis. Between 2008 and 2017, the announcement returns for large (small) companies are higher (lower) than between 2000 and 2007, indicating of a possible change in acquisition dynamics after the financial crisis.

6.2 Size Effect and the Financial Crisis

The financial crisis is defined to last from August 2007 to March 2009. The announcement returns are generally lower during the financial crisis, in line with the findings by Wan and Yiu (2009). There are also indications of a reversed size effect during the crisis period, as the acquirer market capitalization is positively correlated with announcement abnormal returns. Larger firms exhibit ability to benefit from economic shocks, compared to the negative performance of small acquirers. However, comprehensive conclusions of a reversed size effect during the financial crisis cannot be made, because the effect is not robust to all size definitions. Also, against my hypothesis of the size effect during the financial crisis, the amount of assets seems not to be a significant factor during the financial crisis.

On top of the effects on the announcement returns, the financial crisis seems to have several impacts on the deal characteristics. Between 2000 and 2017, almost 16% of total transactions by large firms are paid by equity. However, the same figure is only 4.4% during the financial crisis. This might signal that as the market capitalizations were on downturn during the crisis, large companies with extensive assets preferred to use cash instead of their stock. Small acquirers, on the other hand, are more vulnerable to sudden declines in credit supply (Chen *et al*., 2017), and make consequently fewer cash-only transactions during the financial crisis compared to non-crisis levels. Thus, access to external financing affects the form of payment in acquisitions, especially during the financial crisis.

6.3 Limitations of the Study and Suggestions for Further Research

This study examines announcement abnormal returns in U.S. between 1980 and 2017. The cumulative abnormal returns are measured as in Moeller *et al*. (2004) and this comes with several limitations. The event window is a three-day period, defined as one day before and after the acquisition announcement. Although this is one of the most common ways to conduct event studies, also longer event windows could be examined in further research.

Measurement of cumulative abnormal returns is sensitive to the expected performance of a stock during a given period. Although I use three different market models in predicting the expected stock returns, it is almost impossible to estimate, whether the stock reaction is abnormal return related to the acquisition announcement or non-announcement related noise. Also, the profitability of the acquisition is often impossible to measure from the stock price reaction, as noted by Hietala *et al.* (2003).

Lastly, the objective of this study is to examine the size effect among small and large acquirers with an extensive sample that contains transactions from previously less examined period (2000-2017), and the effects of the financial crisis on the size effect. The definition of the financial crisis comes from previous literature, but the exact time of the crisis is often impossible to define. The methodologies used to analyze the effect of the financial crisis are also used in prior research but are by no means a comprehensive way to study the entire effects of such broad phenomenon. Further research would be needed to specify the firm characteristics and economic conditions most affecting firms' acquisition performance during financial crises.

7. Conclusion

I examine the effects of acquirer size and the financial crisis on acquisition announcement abnormal returns, measured as the cumulative abnormal returns over a three-day event window. Consistent with previous literature on announcement returns (e.g. Moeller *et al*., 2004), the cumulative announcement abnormal returns for all sample firms are 1.46%, while the smallest firms outperform large acquirers by 2.96 percentage points. Small acquirers gain from acquisitions regardless of the period, and form of payment, except when acquiring public firms with equity. Large firms on the other hand, only gain from acquisitions of private companies, when the payment is completely financed with cash.

The financial crisis of 2008 has a negative effect on the announcement abnormal returns. However, the market capitalization of a firm has a positive correlation with abnormal returns during the crisis, suggesting that the size effect may be reversed during financial distress. Moreover, during the financial crisis, the size coefficient is positive (negative), when the acquiring firm is large (small), although the results are statistically insignificant. Thus, the effects of firm size on acquisition performance during the financial crisis remain uncertain, because the results are not robust to using different size measures.

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